FOREST RESEARCH NEWS FOR THE MIDSOUTH

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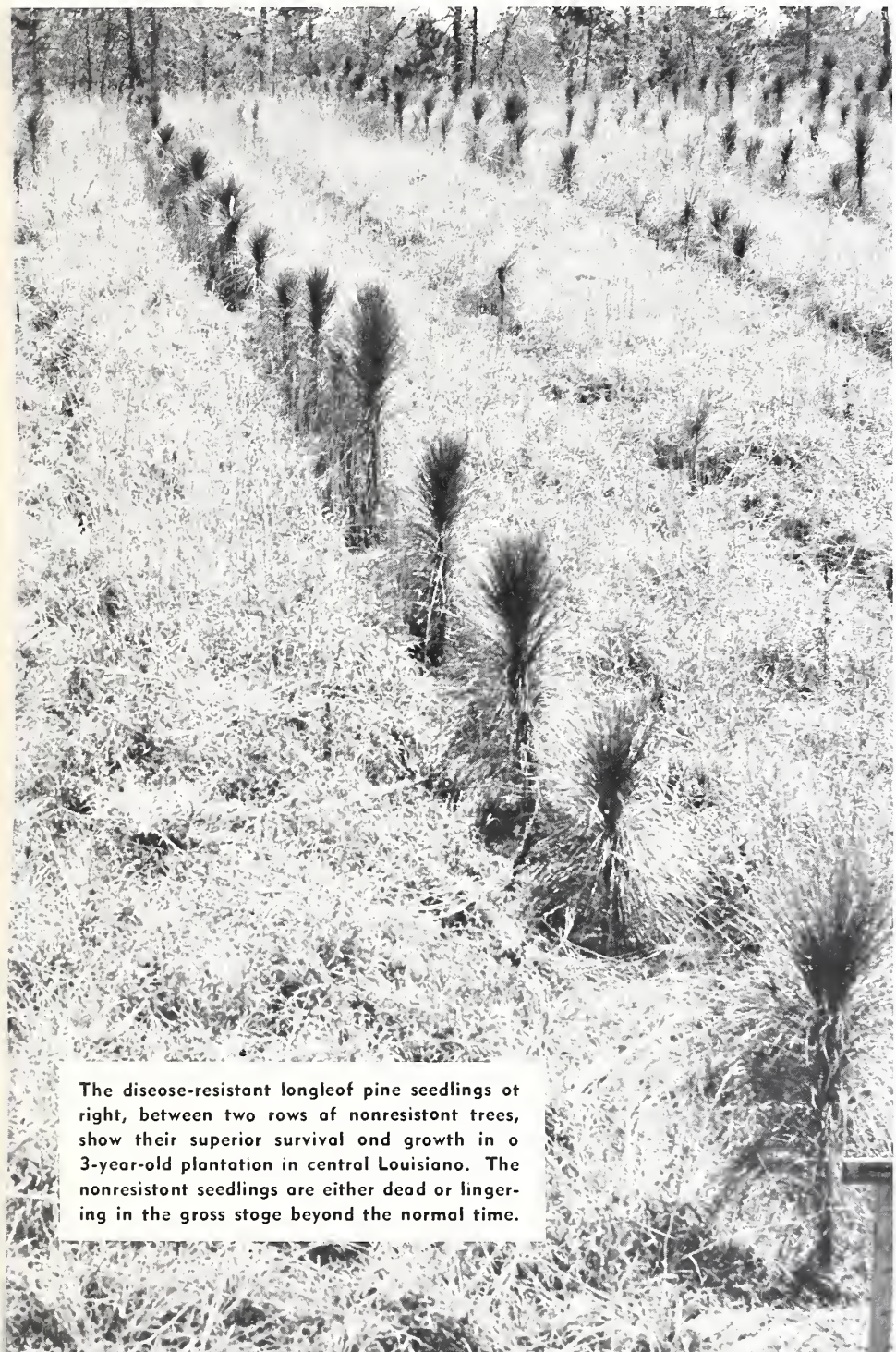
SOUTHERN FOREST EXPERIMENT STATION, FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE

Up, Up, and Away! Well-Bred Longleaf Pines Leave Grass Fast



The disease-resistant longleaf pine seedlings at right, between two rows of nonresistant trees, show their superior survival and growth in a 3-year-old plantation in central Louisiana. The nonresistant seedlings are either dead or lingering in the grass stage beyond the normal time.

Longleaf pine trees can be bred with built-in resistance to damaging brown-spot needle blight.

Proof of brown-spot's heritability has been established by Southern Forest Experiment Station researchers Harold J. Derr and Thomas W. Melder. Their discovery is good news in the search for ways to produce fast growing, disease-free forests in which pests are checked without harm to natural environment.

If such trees can be made available in quantity, there will no longer be a need to spray with fungicide in nurseries. Prescribed burns for control of brown-spot in the forest will be unnecessary. And the fast growth of resistant trees will shorten the time needed till wood can be harvested.

Brown-spot needle blight is caused by the fungus *Scirrhia acicola*. Longleaf seedlings are attacked during their grass stage—the period when they are developing roots and needles but have no stem to speak of. In healthy seedlings the grass stage lasts 1 to 3 years, but disease may prolong it to a decade or more, or may kill the trees outright. Once height growth begins, the trees are safe.

Thirty-three years ago a USDA pathologist noted an ap-

Porent longleof pine tree which yields progeny with superior resistonce to brown-spot needle blight. Known to Southern Stotion reseorchers os "Fother Abrohom," the tree wos discovered in on obondoned nursery where all other seedlings hod been procticolly destroyed by the diseose.

parently healthy seedling among heavily infected neighbors in a nursery bed. He moved it to the Palustris Experimental Forest near Alexandria, Louisiana, where it remained free of the disease and developed naturally.

Wind-pollinated offspring of this tree have consistently showed greater resistance to brown-spot needle blight than their neighbors. In 1961 the tree was used as a parent in controlled crosses with trees that had low infection rates during their seedling stage and hence were presumed to be resistant. It was also crossed with some trees that had no apparent disease resistance. Twenty-two progenies in varying combinations were established in four groups. All testing was done in central Louisiana. The trees were carefully watched and their developments recorded.

When the resistant tree was crossed with nonresistant ones, the progeny were somewhat better than average. Still better results were obtained when the resistant tree was crossed with another resistant one—infection was light, the seedlings left the grass stage and became saplings sooner, and they grew taller age for age.

A report of the Southern Station's scientists' findings appeared recently in FOREST SCIENCE magazine. Reprints may be had by writing to the Southern Station, T-10210 Federal Building, 701 Loyola Avenue, New Orleans, Louisiana 70113.

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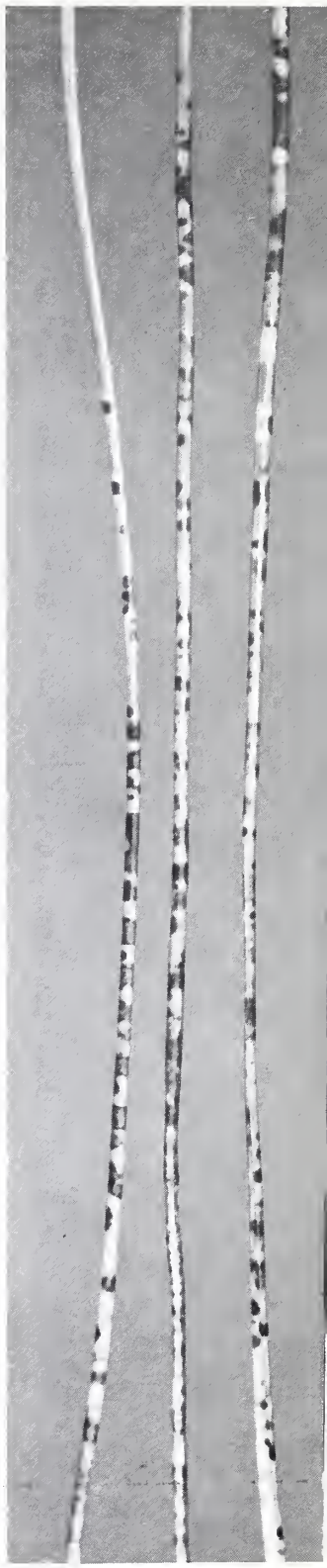
Enough timber wos sold from Notional forests in the South lost yeor to build 100,000 overage-size hames. The octuol amount wos 1,056,000,000 board feet, volued ot $27,600,000.



Close-up of pine needles infected with brown-spot needle blight, one of the most destructive diseoses in southern pine forests.

A Profitable Investment IF—

Cottonwood plantations offer land managers and forest industries the best single way to reverse the decline in forest resources in the Mississippi Delta. But to realize a profit, land managers must follow intensive cultural methods developed through research.

Methods of planting and the odds on getting a profitable return on invested dollars are described in two new Southern Station publications.

High yields of commercially desirable eastern cottonwood can be obtained through a combination of careful site selection, site preparation, cultivation during the first year, and protection from insects and browsing animals. These operations are described in detail in Forest Service Research Paper SO-60, "Planting Cottonwood Cuttings for Timber Production in the South," by J. S. McKnight.

"Anyone preparing to establish a commercial plantation of eastern cottonwood on southern bottom land should recognize that all the recommendations must be followed," says McKnight. "Neglect of any step is likely to lead to failure of the entire operation."

McKnight teamed with forest economists George F. Dutrow and Sam Guttenberg in "Investment Guide for Cottonwood Planters"—Research Paper SO-59—which claims that cottonwood is exceptional among hardwoods both in volume and value growth per acre annually.

Cottonwood stumpage is particularly easy to sell, because marketing options are numerous. The species is utilized for furniture, magazine papers, particle board, hardboard, insulation boards, excelsior, architectural trim, boxes, crates, and a myriad of other items. Cottonwood plantations promise to provide concentrations of timber more attractive to log than typical natural stands, and thus to enhance these marketing opportunities.

Sites that have been found best for growing cottonwoods are the lands still subject to natural overflow of the Mississippi River and its major southern tributaries such as the Red, Arkansas, and St. Francis Rivers. Any good agricultural land provides a satisfactory site.

Cottonwood thrives on well-drained sandy loams and silty loams. Soils with a very high clay content are usually not good. Research Paper SO-60 lists

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It is important to cultivate as close to the young trees as possible. A front-mounted plow is recommended as easiest for the operator to control.

A 10-year-old cottonwood plantation near Greenville, Mississippi.

Utility Companies Given Environmental Criteria

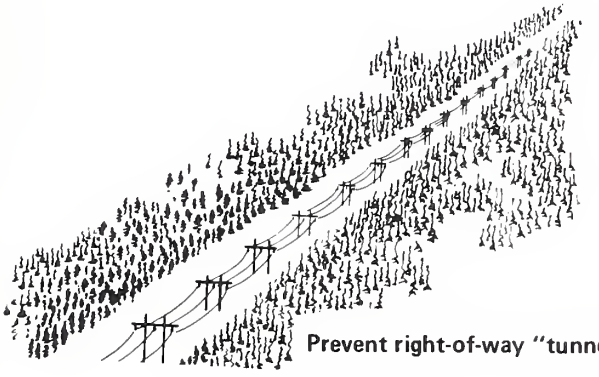
Electric utility companies are faced with building 100,000 miles of new transmission lines every 10 years. And they must do it with as little environmental erosion as possible. A new booklet has been designed to give them an assist.

Called "Environmental Criteria for Electric Transmission Systems," the 52-page booklet was issued jointly by the Departments of Interior and Agriculture. It contains recommendations on route selection, tower design, right-of-way clearing, construction, clean-up, restoration, and maintenance. It also gives criteria on location and design of switchyards, substations, and related communication towers. Recommendations are illustrated with sketches.

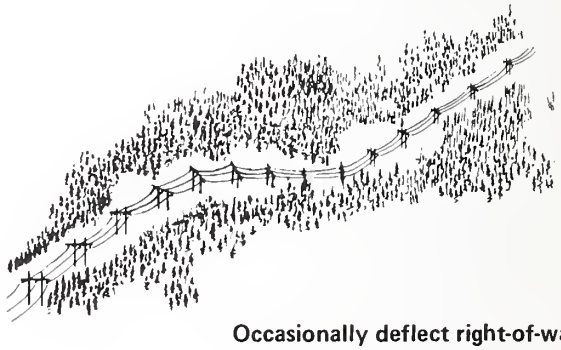
Secretary of Agriculture Clifford M. Hardin and Secretary of the Interior Walter J. Hickel call application of the criteria "a step that can be taken now to restore harmony between man and his surroundings." They urge all electric utilities, private organizations, and Government agencies to adopt the criteria to assure environmental planning.

Approximately 3,600 electric utility companies in the United States operate more than 300,000 miles of transmission lines which pre-empt 4 million acres of land for right-of-way. It is estimated that 1½ million acres of new right-of-way will be required each decade for the remainder of this century.

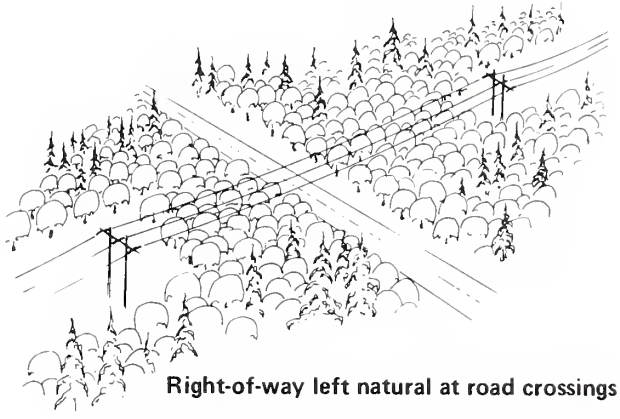
The new publication is available for 65 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20240. It is not available from the Department of the Interior or Department of Agriculture.



Prevent right-of-way "tunnels"



Occasionally deflect right-of-way



Right-of-way left natural at road crossings

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On Successful Seed Storage

For southern pine seeds to remoin viable, they should be kept in cold storage with low moisture content.

Southern pine trees produce a good seed crop every 3 or 4 years. When they do, it is important to be able to store the seed for lean years.

Scientists J. P. Barnett and B. F. McLemore, at the Alexandria Forestry Center of the Southern Forest Experiment Station, have done a lot of research to learn the do's and don'ts of successful seed storage. They have some recommendations which considerably increase chances for success.

Longleaf pine seeds were used for most of the tests. As longleaf seeds are considered difficult to store, it was assumed that conditions safe for them would be satisfactory for other southern pines.

A great many variables were checked out. How does tree age influence seed viability? Does fertilizing the trees influence storability? Is storability genetically controlled—that is, will seed from one tree store better than that from another. What are the most desirable storage conditions?

Barnett and McLemore found that seed viability can be maintained for periods sufficient to meet all practical needs if collecting, processing, and storage are carefully controlled. Longleaf seeds can be kept highly viable for at least 10 years at 0° Fahrenheit if put into storage with moisture contents of no more than 10 percent. Under these conditions, seeds of other southern pines can probably be held even longer.

Cone maturity affects germination initially and after storage. The seeds from immature cones have low initial viability and quickly die in storage.

Longleof pine seeds in troy on right germinoted ofter 5 yeors of storoge ot 0° F. with 8 percent moisture. Seeds in troy ot left were stored for the some period ot 34° with 14 percent moisture.

Seeds in slightly immature cones can be ripened by delaying extraction. Cones of most southern pines can safely be held for a considerable time, but with longleaf delays beyond 60 days are risky. When seeds are extracted, the cone kiln should be held at 105° or less. Cleaning and dewinging machinery should be operated carefully to avoid damage to the seedcoats.

Tree age and fertilization appear to have little influence. There seems to be no consistent genetic effect; seeds collected

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SOUTH'S ANNUAL PULPWOOD HARVEST SURPASSES 40 MILLION CORDS

Pulpwood production in the 12 Southern States totaled 40,869,000 cords in 1969, a rise of 3,793,600 cords over 1968 production. This was the greatest annual increase in the history of the region.

These findings are reported in "Southern Pulpwood Production, 1969," a report by Richard L. Welch, USDA Forest Service. The report is published jointly by the Southern and the Southeastern Forest Experiment Stations at New Orleans, Louisiana, and Asheville, North Carolina. The Southeastern and Southwestern Divisions of the American Pulpwood Association cooperated in gathering the data.

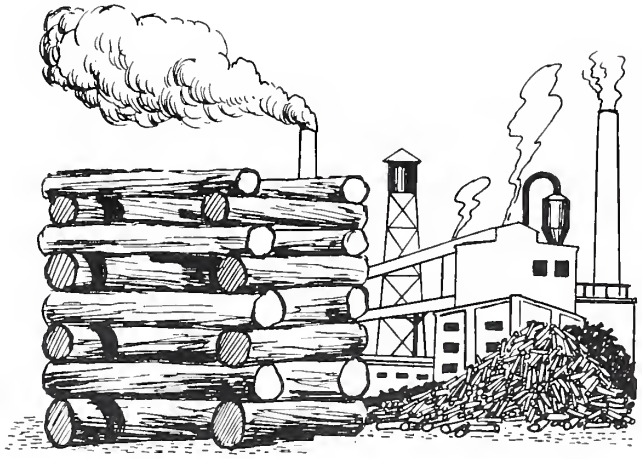
For the first time since 1951, production was up in all the Southern States. Mississippi reported the largest increase—1,116,800 cords. All but three States raised their 1969 output by more than 200,000 cords.

The three leading producers were Georgia, with 7.3 million cords; Alabama, with 6.4 million cords; and Mississippi, with 5.1 million cords.

The total production was made up of 24.5 million cords of softwood bolts, 8.1 million cords of hardwood bolts, and 8.4 million cords of chips and other residues salvaged as byproducts from wood-using plants.

The South supplied wood to 121 mills with a combined pulping capacity of 85,231 tons per day. Of these mills, 105 are in the region and have a daily pulping capacity of 80,980 tons. The pulping capacity of these southern mills was up 5 percent from the 1968 capacity of 77,140 tons.

Copies of the new publication, Resource Bulletin SE-18, are available from the Southern Forest Experiment Station, 701 Loyola Avenue, New Orleans, Louisiana 70113, and from the Southeastern Forest Experiment Station, P. O. Box 2570, Asheville, North Carolina 28802.



Mildew-Protection for Natural-Finish Siding

Many homeowners like a clear finish on siding, to enhance the natural color and grain of lumber and plywood. But most commercially available finishes are so short-lived that they must be renewed frequently. And until now mildewing has been a problem in the warm, humid South.

A penetrating stain giving a durable natural finish has been developed by researchers at the Forest Products Laboratory of USDA's Forest Service in Madison, Wisconsin. Because the stain penetrates the wood surface and forms no coating, there is no blistering or peeling. The penetrating property also eliminates the need for scraping to refinish, so is easy to maintain.

The Laboratory's natural finish was developed for siding, but serves well also on plywood and on wood shingles, roofs, doors, exterior trim, and millwork. It can also be used on wood fences, lawn furniture, and sun decks.

The finish can be in almost any color except pure white. Three colors well-suited for use on siding are cedar, dark redwood, and light redwood. The finish may be applied by brushing or spraying. Smoothly planed surfaces are usually finished with one coat.

The formula is a mixture of boiled linseed oil, mineral spirits, paraffin wax, zinc stearate, pentachlorophenol, and tinting colors. Pentachlorophenol is a widely used preservative and is

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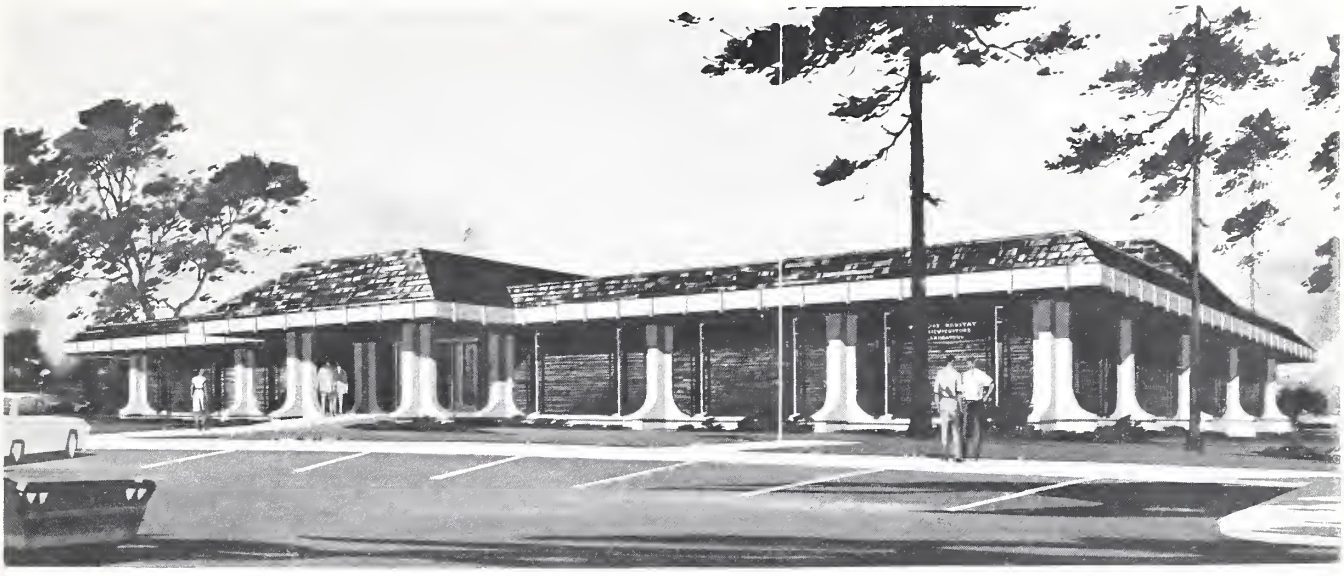
NEW FOREST RESEARCH LABORATORY



Construction is underway on the Southern Forest Experiment Station's new wildlife habitat and silviculture laboratory building at Nacogdoches, Texas. The 10,000-square foot laboratory occupies a 1.5-acre site on the Stephen F. Austin University campus. An architect's sketch of the new building, scheduled for completion during spring '71, appears above.

Breakthrough In Updating Forest Survey Statistics

How much and what kinds of timber can be cut in my area without depleting the forest? Wood processors and resource planners must ask themselves these questions, and Forest Survey units of the USDA Forest Service provide the answers at about 10-year intervals in the Southern States. That is how often the forests of individual States are inventoried and the results reported by county.

Change is generally rapid in southern forests, and most managers planning to build or expand wood-using plants are not satisfied with answers up to 10 years old. Until now, their only alternatives have been expensive special surveys or estimates based on extremely meager information.

Forest Survey analysts Roy C. Beltz and Joe F. Christopher at the Southern Forest Experiment Station have worked out a solution. They have devised a computerized model for updating county timber inventories by applying reliable indicators of change in timber cutting. State forestry agencies, wood-using firms, and trade associations should find the method valuable for updating local resource information when and where needed.

In States where severance taxes are paid on timber cut, the volumes of various products logged in individual counties can be easily determined from public tax records. Other sources of data, such as census reports of industrial output, can also be utilized. The computer program requires only that there be some reliable indicator of timber cutting since the most recent inventory made by the Forest Survey.

How to use the new system is fully explained in USDA Forest Service Resource Bulletin SO-23, "Computer Program for Updating Timber Resource Statistics by County, with Tables for Mississippi." This technical publication and a copy of the computer program are available free upon request from the Southern Forest Experiment Station, 701 Loyola Avenue, New Orleans, Louisiana 70113.

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There are approximately 150,000 owners of commercial forest land in east Texas.

Cottonwood Continued from p. 3

the soils on which the best growth can be expected, those on which good growth has been realized, and those where only mediocre growth was observed. McKnight advises a soil survey, to a depth of 4 feet, of any area being considered for a cottonwood plantation.

In addition to soil features, site selection is influenced by accessibility, size of tract, roughness of terrain, susceptibility to flooding, and nearness to kinds of markets for cottonwood.

Easy access is important in clearing the land, planting, and cultivating after planting. It is also important for thinnings and harvest. The more accessible the site, either by water or highway, the more likely the plantation is to yield a high rate of return on the investment.

The size of the tract required to make the investment practical varies, but generally areas smaller than 100 acres should not be considered unless the tree plantation is managed in conjunction with other farming operations.

Careful site preparation is essential in getting the trees established. Since cottonwood can stand little if any competition for light and moisture when it is young, weed control the first year is important. Diseases and insects must also be controlled, and the tender young shoots must be protected from deer and livestock.

Either seedlings or cuttings can be used as planting stock, but cuttings are preferred in the South. They survive and grow as well as seedlings and are cheaper to procure and plant. Genetically superior strains can be expanded rapidly through vegetative reproduction.

Cuttings of improved clones capable of very fast growth have been developed through research. They will be available to State nurseries in the winter of 1971-72. Nurserymen are urged to plant unimproved stock only when supplies of improved material are insufficient.

Tables in the investment guide indicate how much pulpwood and sawtimber cottonwood plantations can be expected to yield and what it will cost to establish a plantation. Although initial investments for land clearing, planting, and cultivation are high, rapid growth of cottonwood makes possible rates of return up to 16 percent on the best sites.

Both Forest Service Research Paper SO-59 and SO-60 are available from the Southern Forest Experiment Station, 701 Loyola Avenue, New Orleans, Louisiana 70113.

Mildew Protection Continued from p. 6

added to give protection against mildew.

Evidence so far indicates that this finish lasts approximately 3 years on smooth surfaces and up to 8 to 10 years on rough surfaces.

The basic natural finish is described in Research Note FPL-046; southerners should also ask for the special mildew-reducing adaptation of the basic formula. Copies are available from the Southern Forest Experiment Station, T-10210 Federal Building, 701 Loyola Avenue, New Orleans, Louisiana 70113.

Seed Storage Continued from p. 5

from a given tree in 1 year may store well, while seeds collected from the same tree in a different year may store poorly.

Seeds that have been stratified and coated with repellent in preparation for sowing can be held for 1 year without loss of viability.

Details of the Alexandria tests and recommendations for seed storage appeared in an article in the JOURNAL OF FORESTRY, volume 68, number 1. Reprints are available from the Southern Station, 701 Loyola Avenue, New Orleans, Louisiana 70113.

New Way to Measure

Foresters have long needed a way to get accurate measurements of upper tree-stem diameters without climbing or felling the tree. Several instruments have been designed for the purpose, but only the Barr and Stroud dendrometer has qualified as a field-going precision instrument. However, its high cost has deterred its use as a production tool.

An instrument of comparable precision, at a much lower anticipated cost, has been devised by Clement Mesavage, recently retired forest researcher with the Southern Forest Experiment Station of USDA's Forest Service. It is described in Southern Station Research Note SO-95, available from the Southern Station in New Orleans. The title of SO-95 is "Modification of a Zeiss Telemeter Teletop for Precision Dendrometry."